

CLAIMS

1. A polycarboxylic acid copolymer which is obtained by copolymerization of monomer components comprising a polyalkyleneimine unsaturated monomer (A1) and an unsaturated carboxylic acid monomer (B).
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2. The polycarboxylic acid copolymer according to Claim 1,
10 wherein said polyalkyleneimine unsaturated monomer (A1) has an oxyalkylene group.
3. A polycarboxylic acid copolymer which is obtained by copolymerization of monomer components comprising a polyalkylene glycol unsaturated monomer (A2) having a structure such that an oxyalkylene group is bound to a polyhydric alcohol residue, and an unsaturated monocarboxylic acid monomer (B').
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4. A polycarboxylic acid copolymer which is obtained by copolymerization of monomer components comprising a hydroxyl-terminated, polyalkylene glycol unsaturated monomer (A2') having a structure such that an oxyalkylene group is bound to a polyhydric alcohol residue, and an unsaturated carboxylic acid monomer (B).
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5. The polycarboxylic acid copolymer according to Claim 1,
10 wherein said monomer components comprise a polyalkylene glycol unsaturated monomer (A3) other than said monomer having an oxyalkylene group.
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6. The polycarboxylic acid copolymer according to Claim 3,
10 wherein said monomer components comprise a

polyalkylene glycol unsaturated monomer (A3) other than said monomer having an oxyalkylene group.

7. The polycarboxylic acid copolymer according to
5 Claim 4,

wherein said monomer components comprise a polyalkylene glycol unsaturated monomer (A3) other than said monomer having an oxyalkylene group.

10 8. A method of producing a polycarboxylic acid copolymer

which comprises copolymerizing monomer components comprising a monomer (A) having an oxyalkylene group and an unsaturated carboxylic acid monomer (B) using a hydrophobic
15 chain transfer agent.

9. The method of producing a polycarboxylic acid copolymer according to Claim 8,

wherein said hydrophobic chain transfer agent
20 comprises a thiol chain transfer agent having a hydrocarbon group containing not less than 3 carbon atoms.

10. A polycarboxylic acid copolymer
which is obtained by the method of producing a
25 polycarboxylic acid copolymer according to Claim 8.

11. A cement additive

which comprises the polycarboxylic acid copolymer according to Claim 1.

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12. A cement additive
which comprises the polycarboxylic acid copolymer according to Claim 3.

35 13. A cement additive

which comprises the polycarboxylic acid copolymer according to Claim 4.

14. A cement additive

5 which comprises the polycarboxylic acid copolymer according to Claim 10.

15. A cement additive

which has a calcium transfer value of 10 to 900 mPa·s
10 and/or a cement performance coefficient of 0.05 to 1.0.

16. A cement additive

which has, when purified following adjustment to pH 12 to 12.5, a nitrogen content of 0.1 to 20% by weight as determined by elemental analysis,

allows detection of morpholine, 4-(2-hydroxyethyl)morpholine and 1,4-dioxane upon pyrolysis GC-MASS,

shows a peak having no shoulder in GPC,

has a weight average molecular weight (Mw) of 5,000 to 300,000.

shows, in IR measurement, an absorption peak at 1640 to 1660 cm^{-1} whose intensity is not more than 20% of the intensity of the absorption peak occurring at 1710 to 1630 cm^{-1} .

allows detection, in ^{13}C -NMR, of signals at chemical shift positions of 60 to 61 ppm and 69 to 68 ppm,

has an NMR-PEG content of 10 to 99% by weight and has a TCAV of 3 to 900 mg KOH/g.

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17. A cement composition

which comprises at least water, cement and a cement additive,

the cement additive according to Claim 11 being used
35 as said cement additive.

18. A cement composition
which comprises at least water, cement and a cement
additive,

5 the cement additive according to Claim 14 being used
as said cement additive.

19. A cement composition
which comprises at least water, cement and a cement
10 additive,

the cement additive according to Claim 15 being used
as said cement additive.

20. A cement composition
15 which comprises at least water, cement and a cement
additive,

the cement additive according to Claim 16 being used
as said cement additive.